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BULLETIN No. 235

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FEEDING PURE-BRED DRAFT FILLIES

By J. L. EDMONDS AND W. G. KAMMLADE



URBANA, ILLINOIS, NOVEMBER, 1921

## SUMMARY OF BULLETIN No. 235

These experiments have shown that the production of pure-bred draft fillies in Illinois, or where conditions are similar, will be most satisfactory when good pastures and legume roughages form the basis of their rations. Sound, good quality legume roughages, such as alfalfa, may constitute from one-half to two-thirds of the roughage fed; the remainder to consist of carbonaceous roughages such as oat hay, oat straw, or perhaps timothy hay or corn stover.

Pasture is essential. In fact, too much emphasis cannot be placed upon the importance of good pasture in horse production. It is certain that much of the success in growing these fillies was due to the use of nutritious pasture. This pasture was mostly blue grass with some timothy, orchard grass, and clovers.

Abundant pastures and legume hays reduce the grain requirement, but it is not possible to secure the most satisfactory and economical growth and development unless these are supplemented with grain feeds. From experience in the three trials which have been conducted at this Station, it has been found best to feed grain in comparatively small amounts during all seasons rather than to feed it in large quantities at one time and perhaps discontinue its use at other times.

In the third trial the quantity of grain fed was small, but the results in the rate and quality of growth were satisfactory and economical. Lot I received an average of 6.36 pounds of crushed oats and bran per head daily, and Lot II received 5.40 pounds of corn and bran per head daily. These amounts were about the minimum that would produce good growth when fed with alfalfa hay and oat hay.

Of the grain rations fed, the one composed of 75 percent crushed oats and 25 percent bran proved most satisfactory. While a grain ration composed largely of corn, fed with alfalfa hay and pasture, is adequate for the production of growth, it does not, so far as our experience shows, produce fillies of such desirable quality as a ration in which the corn is reduced or from which it is omitted.

Feeding grain and roughage and using pasture in the manner here reported produced good weight and a good growth of frame before the fillies were two years old, and it did not hinder important later development.

# FEEDING PURE-BRED DRAFT FILLIES

By J. L. EDMONDS, PROFESSOR OF HORSE HUSBANDRY, AND  
W. G. KAMMLADE, ASSOCIATE IN ANIMAL HUSBANDRY

## INTRODUCTION

Breeding and feeding are important factors in the successful production of good draft horses. The way in which the draft foal is grown to maturity determines, in no small degree, the animal's selling value and its future utility for work and breeding purposes. Liberal feeding has been advocated more than practiced, yet it is essential if satisfactory growth and size are to be secured. Such feeding must be continued thruout the period of growth, particularly during the first and second years, the time when growth is most rapid. The ultimate results are more satisfactory if the feeding is done in such a way as to produce a regular, even rate of gain. Furthermore, such feeding results in more economical gains than are possible when the animals are heavily fed during one season and neglected during another. This has been the general experience of horse breeders and dealers. Various feeds and methods of feeding may be used with success, provided the feeds are palatable, contain the necessary nutrients, and are fed in proper amounts.

The experiments reported herein are a continuation of the experiment reported in Bulletin 192 of this Station. The former experiment, in which ten Percheron fillies were used, demonstrated that pure-bred draft fillies could be developed satisfactorily by the use of home-grown feeds. The object of the experiments discussed in the present bulletin was to find a ration which would be even more satisfactory for producing high-class fillies than the ration of corn, oats, and alfalfa used in the first experiment. Forty-two fillies have been used in the three trials. The experiments reported in this bulletin will be designated the *second* and *third* experiments.

## PLAN

In each of the last two trials sixteen Percheron weanling fillies, divided into two lots of eight each, were used. Some of the fillies were bred at the University and others were purchased from various breeders in Illinois, Iowa, Ohio, and Virginia. The experiment reported as the second experiment was begun December 12, 1916, and continued until May 13, 1918, a total of 518 days. The last, or third, trial was begun December 31, 1918, and continued until May 3, 1920, a total of 490 days.

## FEED

The rations used in the two experiments described herein were as follows (by weight) :

### *Second Experiment*

#### Lot I:

Corn . . . . .	40 percent
Oats . . . . .	40 percent
Bran . . . . .	20 percent

#### Lot II:

Corn . . . . .	50 percent
Oats . . . . .	50 percent

Both lots in this trial received alfalfa hay and oat straw. The oat straw was cut and mixed with the grain ration during the winter feeding period. During the summer the fillies of each lot were on permanent pasture. Grain was fed three times a day during the first winter. When the fillies were on grass, and during the second winter, grain was fed twice a day. The corn and oats for both lots were ground from the beginning of the experiment until May 29, 1917. After that shelled corn and whole oats were used.

### *Third Experiment*

#### Lot I:

Crushed oats . . . . .	75 percent
Bran . . . . .	25 percent

#### Lot II:

Ground corn . . . . .	75 percent
Bran . . . . .	25 percent

Alfalfa hay was the sole roughage fed to both lots during the first winter. All the fillies were on pasture during the summer. During the second winter oat hay, which was riper than it usually is when cut for such purposes, was fed as a carbonaceous supplement to the alfalfa hay. The regular practice was to feed grain twice each day. Hay was fed twice a day except when the fillies were on pasture, during a part of which time no hay was fed; after the pasture became short and dry, hay was fed once a day.

In both these experiments the alfalfa used was grown on the University farm and was of good quality.

The purpose in both experiments was to obtain good growth on a small amount of grain fed thruout the year, supplemented by an abundance of roughage or pasture. The feeding was done in such a way that all feeds given were thoroly cleaned up. This resulted in almost no waste of feed, and there were no refused feeds to be weighed and recorded. Each lot was fed as a group, from mangers built along



the sides of roomy box stalls which were used as shelter. Hence no record was kept of the amount of feed eaten by individual animals.

The pasture was heavy blue grass with a mixture of timothy, orchard grass, medium red and white clovers. Each lot had access to eight acres, or one acre per head. Some sweet-clover pasture was used for a few days in the second trial. Army worms damaged the permanent pasture in the summer of 1919. During a few weeks of that summer the fillies were turned on oat stubble, which contained a good growth of medium red clover and timothy.

Salt was fed with the grain. Water was available at all times in the barn as well as in the pastures.

### SHELTER

The shelter for the fillies consisted of two box stalls for each lot, one measuring 16 x 16 feet and one 16 x 20 feet. The entrances to the box stalls were equipped with two doors, an inner slat door and an outer solid door. During the winter if the weather was mild, only the slat doors were closed at night; if it was stormy or very cold, the outer solid doors were partly or entirely closed as a protection against drafts but provision was always made for the free circulation of air thru the stalls. These doors were 8 feet wide and opened into cinder exercise lots, which connected the barn with the pasture. The fillies were in these lots every day during the winter and ran on pasture from spring until early winter. This method of stabling insured sufficient protection without any undue restriction of opportunity for exercise; and exercise must accompany good feeding if the best all-around results are to be obtained. During the summer canvas "flappers" nailed to the over-head joists assisted in keeping the flies off the backs of the fillies. An application of coal-tar disinfectant to the lower part of the canvas prevented it from being chewed or torn down.

### BEDDING

Shavings and wheat straw were generally used as bedding; a small amount of the straw was eaten by the fillies. Some oat straw was used during the first winter of the last experiment. The manure was removed from the stalls each day.

### GROOMING

During the winter the fillies were occasionally given a hurried grooming with a "dandy brush." As often as necessary, about once a month, their feet were levelled with a hoof rasp.

## DISCUSSION OF RESULTS

The tables have been constructed to show as clearly as possible the results of the experiments, hence the discussion will be brief and will concern those features of the trials not sufficiently emphasized by the tables.

### FEED CONSUMED

Grain was fed thruout each of the experiments and alfalfa hay was fed except during a very few periods of the pasture season. In the second trial when the fillies were not on pasture the alfalfa was fed at an average rate of about one pound per hundredweight per day. Oat straw was fed in amounts of two pounds per head per day. The feeding of alfalfa hay reduced the grain requirement.

*Second Experiment.*—There was no great difference in the feed consumption per head of the two lots in the second experiment. Lot I, fed corn 40 percent, oats 40 percent, and bran 20 percent, by weight, ate only 80.81 pounds of grain and 405 pounds of hay more per head than Lot II, fed corn 50 percent and oats 50 percent, and made 6.2 pounds greater average gain in weight. So far as these rations can be judged from this trial, there is no great difference in their efficiency for producing gain in weight. The results obtained with the corn and oats ration fed Lot II seem to agree with those of the first experiment, reported in Bulletin 192, and show that good gains may be made without using purchased mill feeds. It is believed, however, that even tho the fillies of Lot I ate a little more feed and required a slightly greater amount of feed per pound of gain, the grain ration of corn, oats, and bran which they received gave better results than the grain ration of 50 percent corn and 50 percent oats fed Lot II. The use of bran and a smaller percentage of corn in the ration of Lot I seemed to produce growth of better quality and cleaner legs than was obtained with corn and oats in Lot II. This statement is based on the observation of the men who conducted the experiment and upon the opinion of a number of horsemen who saw the fillies at the close of the experiments. Home-grown feeds of good quality carefully fed in proper amounts, without the addition of commercial mixed feeds or condiments of any kind, produced a satisfactory rate of growth in this experiment. A little less alfalfa and more straw probably would have been as satisfactory as the roughage ration given. Economy during the winter was secured by feeding roughage liberally and enough grain to maintain a thrifty, growing condition.

A summary of the feed consumption per head, in terms of bushels and tons, follows. The detailed data will be found on pages 348 and 352.

	First winter (155 days)	Summer (160 days)	Second winter (203 days)	1 Year	1 Year 5 months
LOT I					
Oats (bu.) . . . .	16.58	11.95	18.12	33.67	46.64
Corn (bu.) . . . .	9.47	6.83	10.36	19.24	26.65
Bran (lbs.) . . . .	265.25	191.13	961.96	538.69	1418.34
Alfalfa (tons) . .	.84	.28	1.76	1.41	2.88
Straw (tons) . . .	.14	.....	.09	.175	.23
LOT II					
Oats (bu.) . . . .	20.38	14.75	21.91	41.56	57.04
Corn (bu.) . . . .	11.64	8.43	12.52	23.75	35.59
<sup>1</sup> Bran (lbs.) . . . .	.....	.....	672.00	.....	672.00
Alfalfa (tons) ..	.73	.28	1.67	1.30	2.68
Straw (tons) ...	.14	.....	.09	.174	.23

<sup>1</sup>Bran was fed for several days when the fillies had influenza.

*Third Experiment.*—In the third experiment Lot I, during the 490 days, ate 468 pounds more of grain and 40.5 pounds less of alfalfa per head than Lot II. Both lots received an average, for the 490 days, of .54 pound of alfalfa per hundredweight per day. During the first winter (112 days) of this trial the alfalfa fed daily amounted to 1.3 pounds per hundredweight. However, during the second winter a much smaller quantity of alfalfa (.55 pound per hundredweight per day) was fed and Lot I received .871 pound and Lot II .857 pound of oat hay per hundredweight per day. The results during the second winter were very satisfactory.

Attention is called to the low amount of grain fed per hundredweight and to the small amount required per pound of gain in both lots. As an average for the entire experiment Lot I received only .533 pound and Lot II .445 pound of grain per hundredweight per day. Four and nine-tenths pounds of grain were required per pound of gain for Lot I and 4.16 pounds of grain per pound of gain for Lot II.

It is doubtful if satisfactory size could have been secured on a smaller amount of feed than that given in this trial. The growth made was at the rate of 1.3 pounds per head per day for both lots. Of the two grain rations, the one consisting of 75 percent crushed oats and 25 percent bran fed Lot I was more satisfactory than the one made up of 75 percent ground corn and 25 percent bran, when fed with alfalfa hay and oat hay. During the first winter of this trial, the corn, bran, and alfalfa ration fed Lot II did not prove entirely satisfactory; the fillies of this lot were usually somewhat too fat and there was a little trouble in keeping their legs in the best condition. The use of oat hay to replace part of the alfalfa during the second winter resulted in considerable improvement in this lot.

The detailed data concerning feed consumption will be found on pages 354 and 358. Converted to bushels and tons, the consumption per horse during the third experiment was as follows:

	First winter (112 days)	Summer (175 days)	Second winter (203 days)	1 Year	1 Year 4½ months
LOT I					
Oats (bu.) . . . . .	13.33	24.33	35.35	43.27	73.01
Bran (lbs.) . . . . .	142.14	259.50	377.10	461.55	778.74
Alfalfa (tons) ..	.68	.13	.78	1.07	1.59
Oat hay (tons)..	.....	.04	1.21	.42	1.25
LOT II					
Corn (bu.) . . . . .	7.38	12.74	15.33	22.73	35.45
Bran (lbs.) . . . . .	137.70	237.88	286.16	424.20	661.73
Alfalfa (tons) ..	.71	.13	.78	1.09	1.61
Oat hay (tons)..	.....	.04	1.21	.42	1.25

It seems advisable, judging from the results of this experiment, not to feed a heavy alfalfa ration with corn to growing horses, particularly to pure-breds when seeking the best possible development. Alfalfa is a very valuable roughage for growing horses, but experience at this Station indicates that more satisfactory results may be obtained when it is not fed as the sole roughage but is supplemented with such roughages as oat hay or oat straw. The use of these carbonaceous roughages also reduced the cost of feed. *The ration fed Lot I in this trial, consisting of crushed oats 75 percent and bran 25 percent, fed with alfalfa hay supplemented with oat hay, was more satisfactory for the production of good, sound two-year-old Percheron fillies than any of the other rations used in these experiments.* While the results of the experiments show this ration to be most satisfactory for producing the very highest class of pure-bred draft fillies, still it is possible to secure good results from rations composed of home-grown feeds, as reported in Bulletin 192 and as used in Lot II of the second experiment. Altho the fillies of Lot II in this experiment were fatter, there were not so many high-class individuals in the lot at the close of the trial as there were in Lot I. This may have been due in part to the ration and in part to the lack of "outcome" in the fillies of Lot II.

#### USE OF CARBONACEOUS ROUGHAGE

The results of these two tests, particularly of the last one, show the possibility of limiting the alfalfa, preferably to one-half or two-thirds of the roughage fed, and of using some carbonaceous roughage, such as oat straw or oat hay, except during the pasture season. Such feeding resulted in lower feed costs and did not reduce the efficiency of the ration. When the fillies received a too liberal allowance of

alfalfa, they did not eat satisfactory amounts of the straw or oat hay. Altho not used in these experiments, it is probable that corn stover or similar roughages would be satisfactory supplements to alfalfa for producing growth and as a means of economy.

### VALUE OF PASTURE

The pasture used in these experiments proved to be a very important factor in the development of the fillies. In order to maintain a regular rate of growth on pasture, it was found necessary to feed some grain thruout the summer. In fact these trials showed it to be necessary, in order to obtain the best results, to feed some grain at all times during the year. Feeding grain in this way means real economy. It was also found advisable in these trials to feed some legume hay during part of the pasture season, when the grass had become dry, tough, and unpalatable. While the daily gain was less on pasture than during the first winter seasons, nevertheless the fillies in all lots made excellent growth in frame during the summer. This development of frame was very desirable and was greater and of more importance than the weights for the summer season indicate. In this work much of the success depended upon an abundance of palatable and nutritious grass. The pasture afforded abundant exercise, which helped to keep the joints clean and was conducive to good health. An acre of pasture per head is the minimum for yearlings, and more is necessary if the grass is not abundant.

### WEIGHTS AND HEIGHTS

The fillies were weighed once each week and the height was measured at the beginning of each 28-day period. The gains were as uniform as could be expected because there was some variation in age, size, and condition of the fillies at the beginning of the experiment and also because of some variation in the size of the parents. The majority of the fillies were not the progeny of extremely large sires and dams, and the purpose in feeding was not only to make good weight at a given age but to produce good, clean-jointed individuals. There were few blemishes in any of the lots. A few slightly filled hocks occurred in the lots that received the most corn. During the third trial one bone spavin developed as the result of an injury to one filly in Lot II.

Attention is called to the fact that during the last period of each trial the average gain was nearly two pounds per day. This is significant because it shows that the fillies were not finished in growth and were capable of making further gains, and probably capable of attaining weights of 1,800 to 2,000 pounds at maturity. As already stated, a better kind of growth was produced in Lot I in both experiments than in Lot II. This apparently resulted from the smaller

proportion of corn in the ration of Lot I of the second experiment and its omission entirely from the ration of Lot I of the third experiment.

The fillies received no severe setback in growth. The most marked interruptions in the rate of gains were due to influenza during the winter and to the annoyance by flies during the hot weather. The importance of securing good growth the first year is clearly shown when the comparatively small gain during the second year is compared with the weight at one year. It will be seen that the largest gains per day were made during the first winter and that less feed was required per pound gain at that time than at any other, when the pasture is figured with the roughage fed during the summer. Rapid, cheap gains are made on young animals; hence, the importance of liberal feeding at this time. For detailed data the reader is referred to Tables 2 to 5 of each experiment, which are to be found on pages 349-52 and 355-58.

In considering the heights of the fillies by 28-day periods, it should be remembered that it is difficult to get young fillies to stand properly and to apply the standard in the same manner at the same point of the withers each time. In addition, the variation in wear of hoofs at different seasons of the year and the levelling of the feet at various times made an accurate record of changes in height impossible. "Losses" in height during certain periods are due to such conditions as mentioned.

The pictures of the fillies were taken at the close of the trials. A good idea of the kind of development made may be obtained from these pictures.

#### SUMMARY OF THE THREE EXPERIMENTS

The last table (page 360) contains a summary of the three experiments which have been conducted. This table is given as a means of readily comparing the more important features of the three experiments.

#### COST OF FEEDS

The tables showing the cost of feeds (pages 353 and 359) are largely the result of using prices which prevailed before the war. Some additional cost figures are given in each of the tables to more nearly show the cost at the time the experiments were conducted.

In both of these experiments the rations fed Lot II were cheaper than the rations fed Lot I. Of course, the extreme fluctuations in the prices of farm products make any cost table of more or less temporary value; but if one knows, at least in approximate amounts, the quantity of feed required to grow a horse a year, the cost may be calculated readily on the basis of current prices. Economical feeding should be the aim always, but poor feeding to lessen the cost of production is false economy.

The average cost per head per day for each lot of these two experiments, on the basis of the "A" prices given below each of the cost tables, was as follows:

*Second Experiment*

Lot I .....	21.1 cents
Lot II .....	20.0 cents

*Third Experiment*

Lot I .....	17.3 cents
Lot II .....	15.1 cents

While it is true that the fillies of Lot I of the third experiment were better fillies at the close of the trial than the fillies of Lot II of the same experiment, it may be that some will find it more desirable to use the ration fed Lot II on account of the lower cost of the ration. It is very probable that where one is not attempting to produce the very highest class of draft horses this ration will be very satisfactory.

### THE INDIVIDUALS OF THE VARIOUS LOTS AS THEY APPEAR IN THE FOLLOWING ILLUSTRATIONS

## LOT I, SECOND EXPERIMENT (FIGS. 1, 3, and 4)

1. Carbie, 130521. W. S. Corsa, Whitehall, Ill.
2. Irene, 124523. University of Illinois
3. Norma, 137694. A. L. Robison & Sons, Pekin, Ill.
4. Hodgson's Choice, 123379. M. C. Hodgson & Sons, Ottawa, Ill.
5. Hodgson's Belle, 123378. M. C. Hodgson & Sons, Ottawa, Ill.
6. Carins, 130522. E. B. White, Leesburg, Va.
7. Sylvera, 129803. G. L. Francis, New Lenox, Ill.
8. Carnona, III, 130523. W. S. Corsa, Whitehall, Ill.

## LOT II, SECOND EXPERIMENT (FIGS. 2, 5, and 6)

9. Keota Daisy, 129175. C. F. Singmaster, Keota, Iowa
10. Oaklawn's Selection, 129350. J. M. Gillmore, Forest City, Ill.
11. Black Belle, 127468. Leslie Beland, Crescent City, Ill.
12. Jane, 124525. University of Illinois
13. Maple Grove Violet, 129149. J. O. Singmaster & Sons, Keota, Iowa
14. Blanlo, 130520. L. R. Wiley, Sr., Ellendale, Kan.
15. Modestine, 130141. Dunham's, Wayne, Ill.
16. Dunham's Choice Goods, 128656. J. H. Bereman, Aurora, Ill.

## LOT I, THIRD EXPERIMENT (Fig. 7)

1. Hodgsons Quality, 148920. M. C. Hodgson & Sons, Ottawa, Ill.
2. Mafalda, 148153. G. L. Francis, New Lenox, Ill.
3. Ionita, 148542. W. S. Corsa, Whitehall, Ill.
4. Avelita, 149380. R. D. Bridges & Son, Leesburg, Va.
5. Louise, 147554. L. F. Stubblefield & Sons, McLean, Ill.
6. Blossom, 148587. University of Illinois
7. Columbia, 148583. University of Illinois
8. Amy, 148581. University of Illinois

## LOT II, THIRD EXPERIMENT (Fig. 8)

9. Hodgson's Gold Medal, 148919. M. C. Hodgson & Sons, Ottawa, Ill.
10. Mayflower, 147963. Geo. Frerichs & Sons, Gilman, Ill.
11. Jewel, 148579. University of Illinois
12. Alene C., 148379. C. F. Camp, Homerville, Ohio
13. Janet, 148582. University of Illinois
14. Clarissa, 147961. I. Argenbright, Blandinsville, Ill.
15. Cavill, 148721. E. B. White, Leesburg, Va.
16. Ellen C., 148377. C. F. Camp, Homerville, Ohio

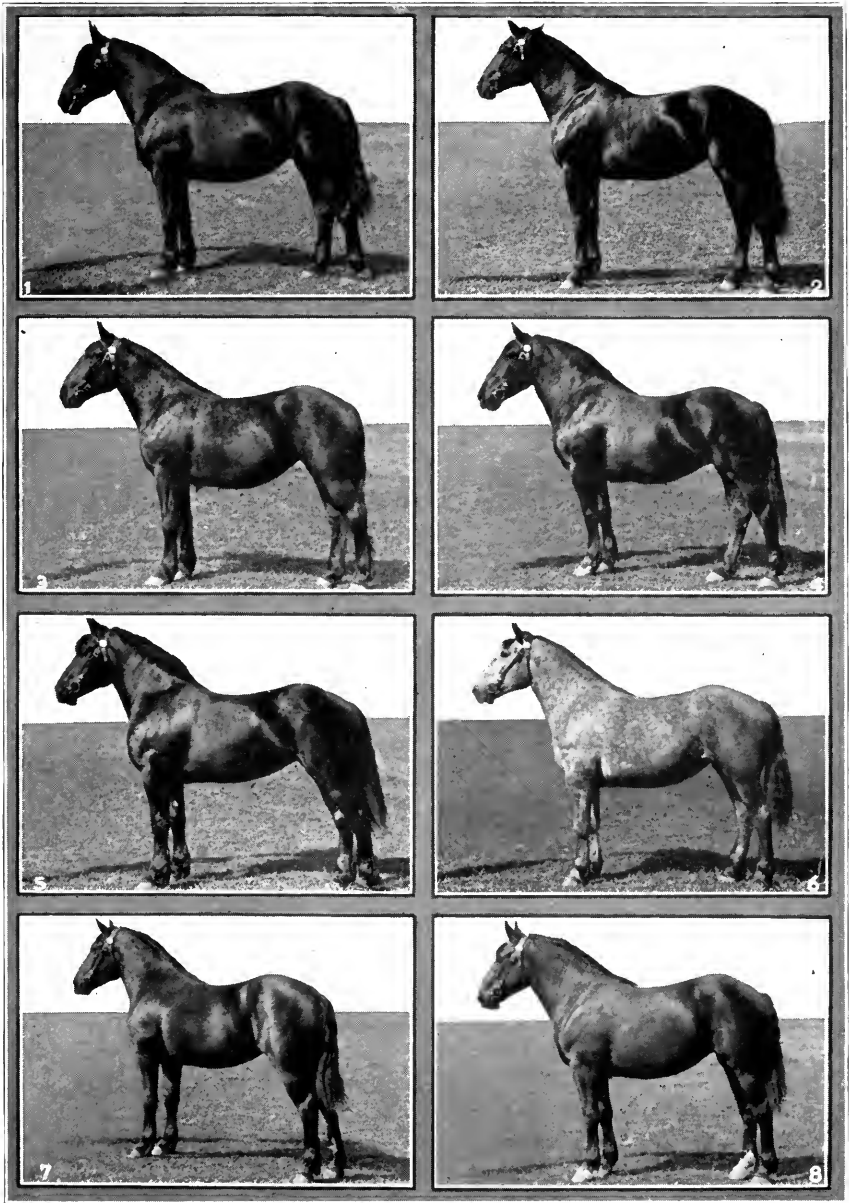


FIG. 1.—THE FILLIES OF LOT I. SECOND EXPERIMENT, AT TWO YEARS OF AGE

This lot was fed a ration of corn, oats, and bran, supplemented with alfalfa hay, oat straw, and pasture. The ration appeared to produce slightly better development than the ration fed Lot II.



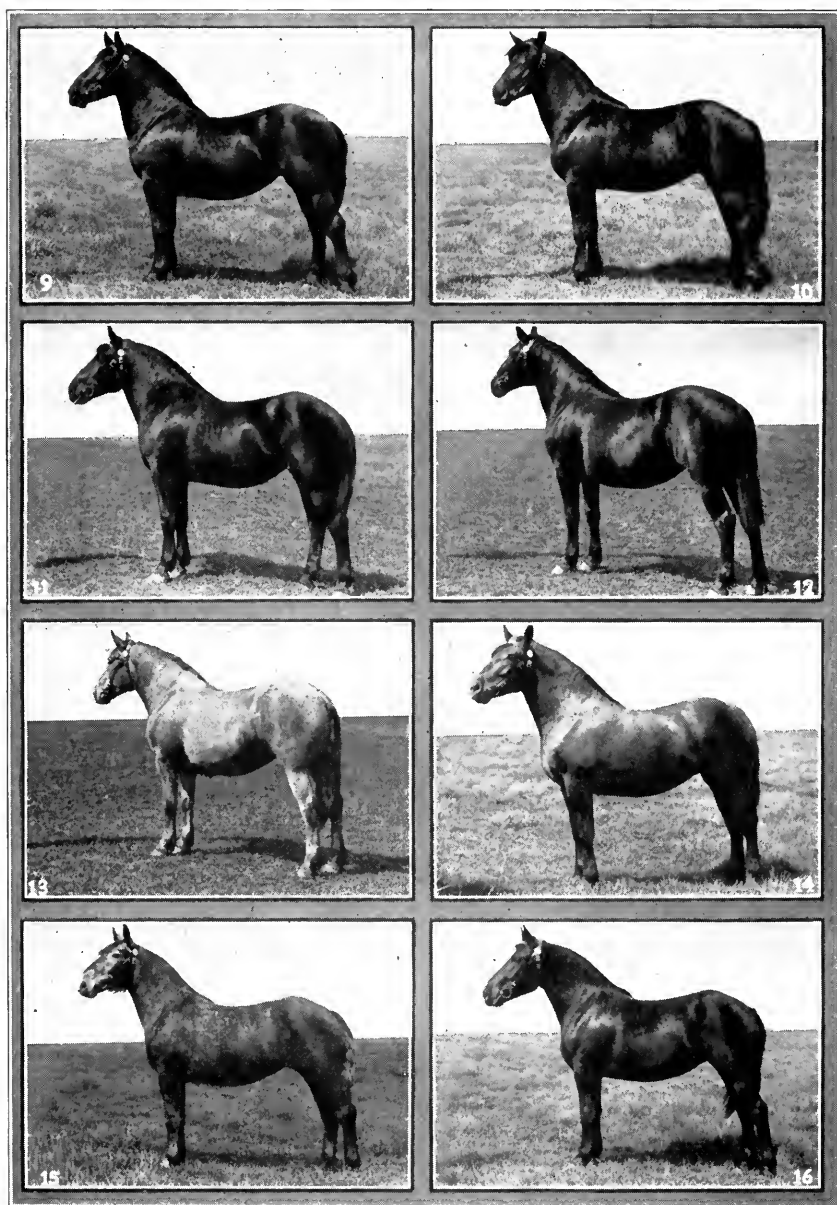


FIG. 2.—THE FILLIES OF LOT II, SECOND EXPERIMENT, AT TWO YEARS OF AGE

A ration of corn and oats, with alfalfa hay, oat straw, and pasture was fed to this lot. The individuals were a little fatter than those of Lot I, but not so desirable in quality. The greater proportion of corn fed was probably the cause of the difference.

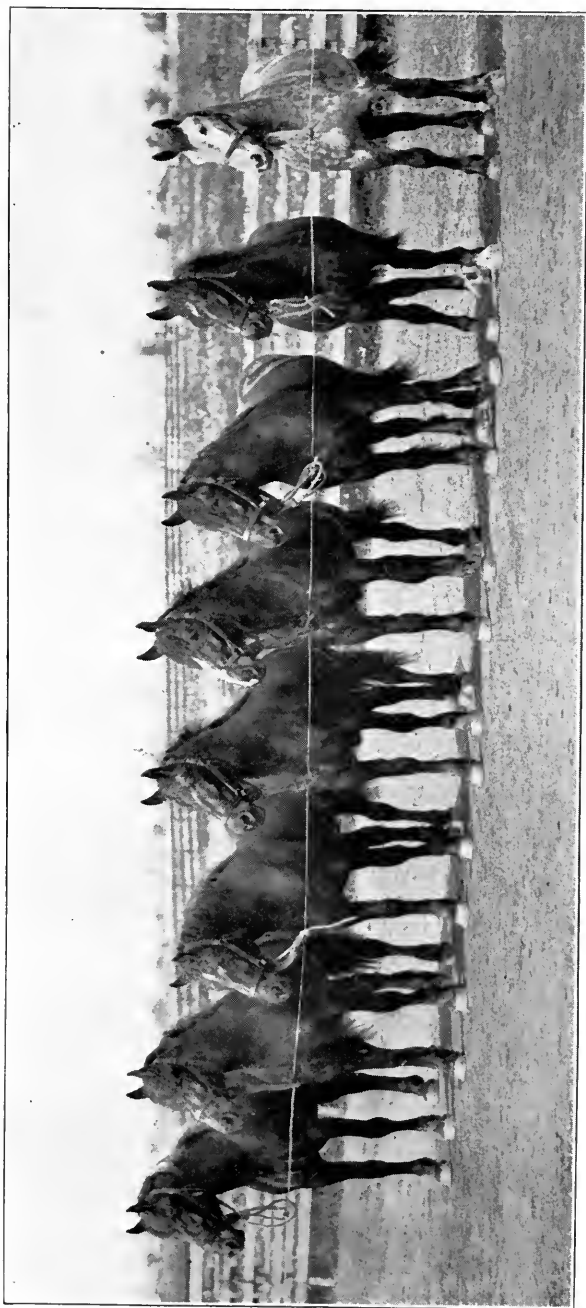


FIG. 3.—THE FILLIES OF LOT I, SECOND EXPERIMENT, AS TWO-YEAR OLDS  
Numbered from left to right: 2, 5, 7, 4, 1, 3, 8, 6.

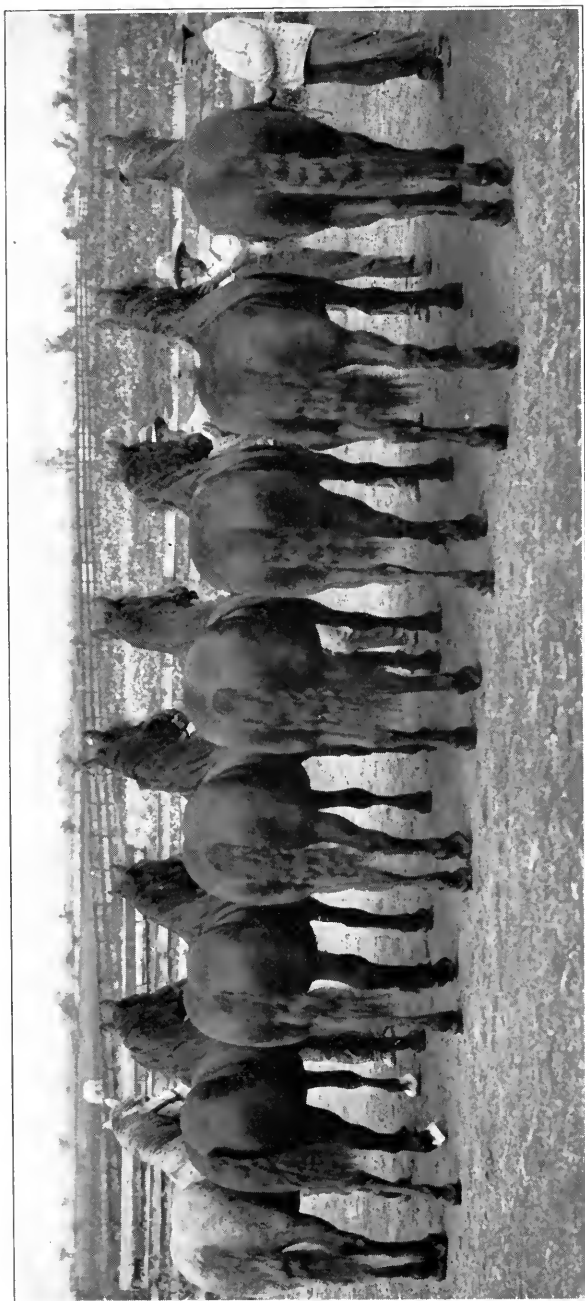


FIG. 4.—THE SAME AS FIG. 3  
The numbering is reversed. From left to right: 6, 8, 3, 1, 4, 7, 5, 2.

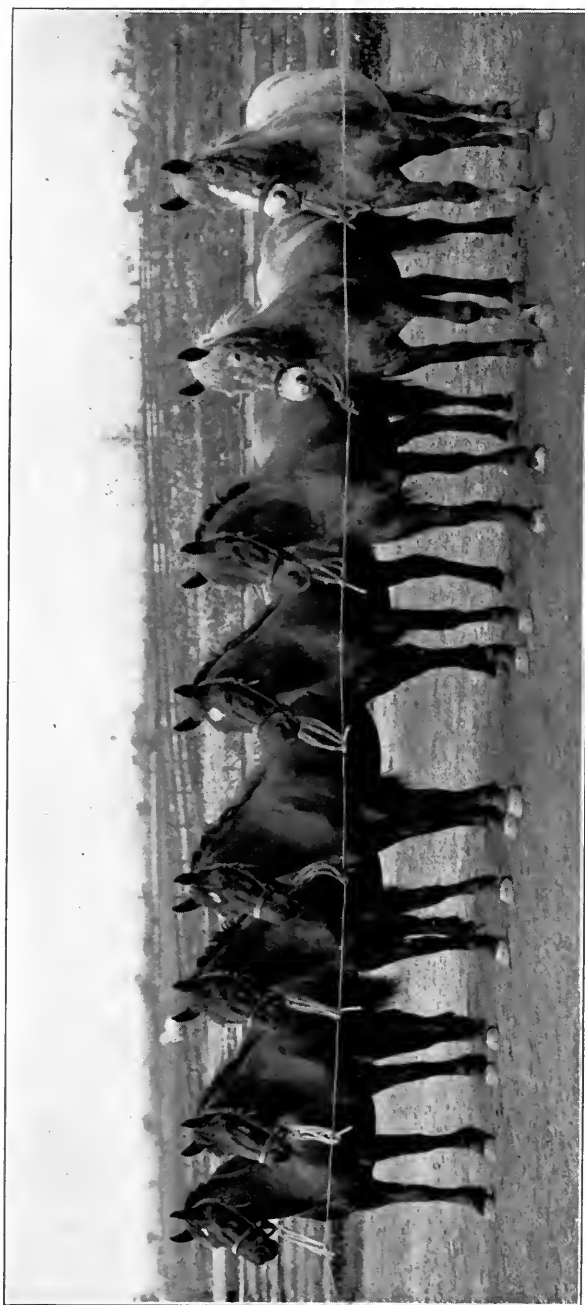


FIG. 5.—THE FILLIES OF LOT II, SECOND EXPERIMENT, AS TWO-YEAR OLDS  
Numbered from left to right: 9, 10, 12, 11, 16, 14, 15, 13.

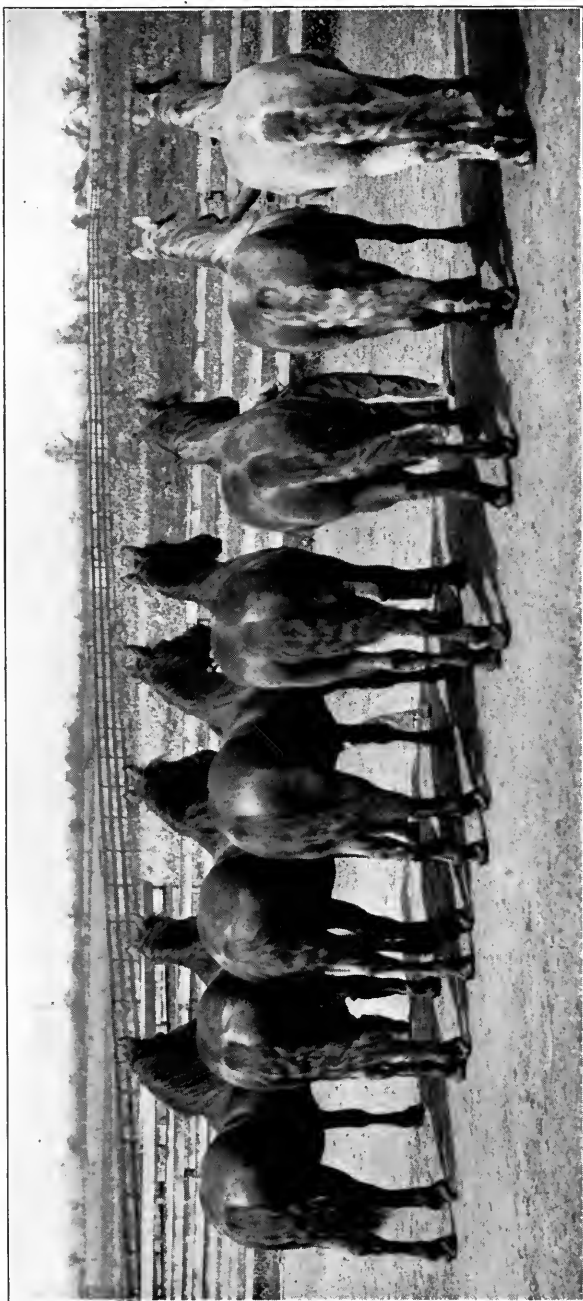


FIG. 6.—THE SAME AS FIG. 5.  
Numbered from left to right: 9, 10, 12, 11, 16, 14, 15, 13.

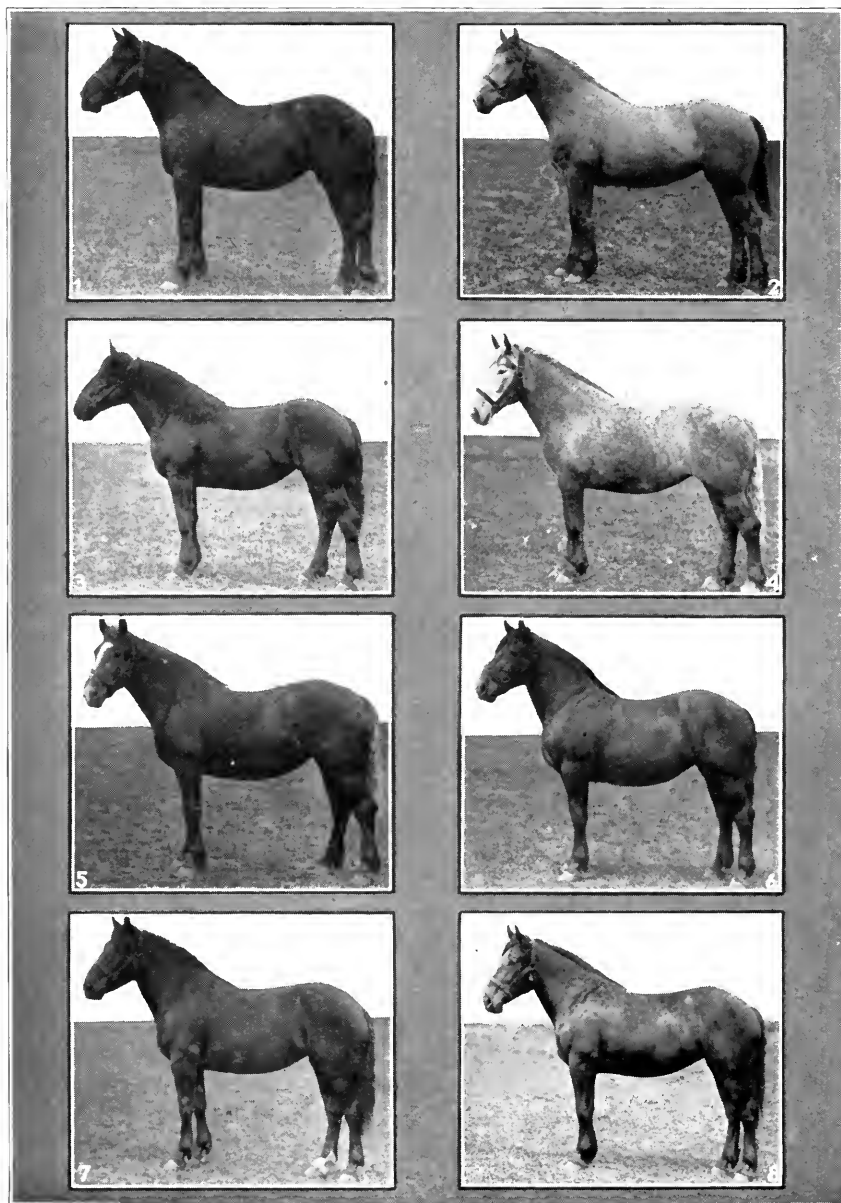


FIG. 7.—THE FILLIES OF LOT I, THIRD EXPERIMENT, AT TWO YEARS OF AGE

The ration fed this lot was the most satisfactory of any of the rations of the three experiments. It consisted of crushed oats 75 percent and bran 25 percent, with alfalfa hay, oat hay, and pasture. These fillies had very clean legs and joints, and possessed the general quality so desirable in pure-bred fillies of this class.

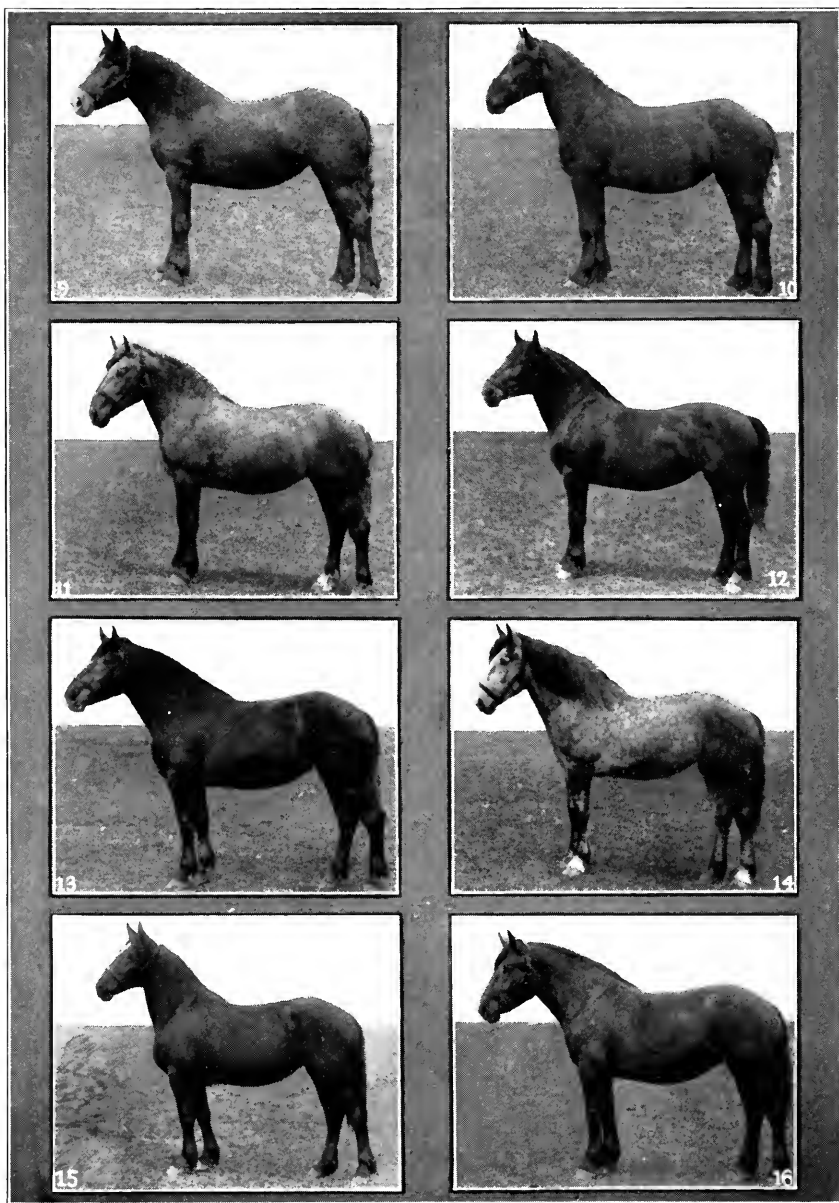


FIG. 8.—THE FILLIES OF LOT II, THIRD EXPERIMENT, AT TWO YEARS OF AGE

This lot was fed ground corn 75 percent and bran 25 percent, with alfalfa hay, oat straw, and pasture. This ration kept the fillies in higher condition than Lot I, but did not produce the same desirable quality. Better results were obtained where corn was reduced or omitted.

## Second Experiment

TABLE 1.—FEED CONSUMED

Lot I—Grain: Corn, 40 percent; Oats, 40 percent; Bran, 20 percent } Alfalfa Hay, Oat Straw, and Pasture  
 Lot II—Grain: Corn, 50 percent; Oats, 50 percent

Period: 28 days	Average daily ration per head						Average daily feed per cwt. of animal					
	Grain		Alfalfa hay		Oat straw		Grain		Alfalfa hay		Oat straw	
	Lot I	Lot II	Lot I	Lot II	Lot I	Lot II	Lot I	Lot II	Lot I	Lot II	Lot I	Lot II
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Dec. 12, 1916—Jan. 8, 1917.....	6.63	6.63	8.00	8.00	2.00	2.00	.796	.792	.960	.956	.240	.239
Jan. 9—Feb. 5.....	8.03	8.03	8.89	8.00	2.00	2.00	.906	.910	1.003	.907	.226	.227
Feb. 6—Mar. 5.....	8.26	8.26	11.35	9.25	2.00	2.00	.870	.877	1.196	.983	.211	.212
Mar. 6—Apr. 2.....	9.18	8.87	12.27	10.31	2.00	1.93	.916	.896	1.224	1.042	.200	.195
Apr. 3—Apr. 30.....	9.91	9.47	12.42	10.42	2.00	2.00	.936	.906	1.173	.997	.189	.191
May 1—May 28.....	7.93	7.84	7.12	5.88	.....	.....	.716	.716	.643	.537	.....	.....
May 29—June 25.....	5.86	5.77	.....	.....	.....	.....	.496	.497	.....	.....	.....	.....
June 26—July 23.....	6.03	5.91	.....	.....	.....	.....	.494	.494	.....	.....	.....	.....
July 24—Aug. 20.....	6.09	6.03	2.84	2.84	.....	.....	.498	.504	.232	.237	.....	.....
Aug. 21—Sept. 17.....	6.06	6.00	7.00	7.00	.....	.....	.493	.495	.569	.578	.....	.....
Sept. 18—Oct. 15.....	6.00	6.00	8.00	8.00	.....	.....	.480	.483	.640	.645	.....	.....
Oct. 16—Nov. 12.....	6.82	6.82	10.13	10.13	.50	.50	.529	.534	.785	.793	.039	.039
Nov. 13—Dec. 10.....	9.38	9.38	13.13	13.13	2.00	2.00	.714	.718	.999	1.005	.152	.153
Dec. 11, 1917—Jan. 7, 1918.....	12.50	12.50	14.00	13.88	2.00	2.00	.926	.930	1.037	1.033	.148	.149
Jan. 8—Feb. 4.....	12.50	12.50	15.63	14.88	2.00	2.00	.910	.905	1.138	1.078	.146	.145
Feb. 5—Mar. 4.....	12.50	12.50	19.44	17.31	.....	.....	.883	.879	1.374	1.217	.....	.....
Mar. 5—Apr. 1.....	10.14	9.82	20.75	19.44	.....	.....	.698	.670	1.427	1.327	.....	.....
Apr. 2—Apr. 29.....	8.69	7.81	22.47	21.25	.....	.....	.584	.526	1.511	1.431	.....	.....
Apr. 30—May 13 (14 days).....	9.50	8.50	24.75	23.25	.....	.....	.621	.556	1.618	1.521	.....	.....
Total time:												
Dec. 12, 1916—May 13, 1918,	8.50	8.35	11.12	10.34	.892 <sup>1</sup>	.891	.703	.695	.920	.861	.074 <sup>1</sup>	.074 <sup>1</sup>
518 days.....												

<sup>1</sup>Average for entire experiment, or 518 days: approximately 2 pounds per head daily on basis of actual number of days the straw was fed.

NOTE.—Corn and oats for both lots were ground until May 29, 1917. Thereafter shelled corn and whole oats were fed.



## Second Experiment

TABLE 2.—AGE, HEIGHT, AND WEIGHT OF FILLIES

Name	Age:	Height:		Height:		Weight:		Gain:		Gain:		Final weight
	Dec. 12, 1916	Dec. 12, 1916	Dec. 12, 1916	May 13, 1918	Dec. 12, 1916	Dec. 12, 1916	Dec. 10, 1917	May 13, 1918				
	days	hands	inches	hands	inches	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	
Lot I:												
Carbie.....	229	13	2	15	3	775	555	735	1510		1510	
Irene.....	271	14	2 1/4	16	1 3/4	930	430	660	1590		1590	
Norma.....	232	13	3	15	3 1/4	805	405	635	1440		1440	
Hodgson's Choice.....	228	14		15	3 1/2	900	550	725	1625		1625	
Hodgson's Belle.....	232	14	1 1/2	15	3 1/4	880	540	800	1680		1680	
Carins.....	226	13	3 1/2	15	3 1/2	745	505	785	1530		1530	
Sylvira.....	237	13	3 1/2	16		825	555	795	1620		1620	
Carnona III.....	188	13	1 1/2	15	1 3/4	630	520	725	1355		1355	
Average.....	230	13	3 1/2	15	3 1/4	811.3	507.5	732.5	1543.8		1543.8	
Lot II:												
Keota Daisy.....	210	13	2	15	1 1/2	915	385	665	1580		1580	
Oaklawn's Selection.....	234	14	1 1/2	16	1 1/2	815	435	625	1440		1440	
Black Belle.....	204	13	3 1/2	15	3 1/2	835	515	745	1580		1580	
Jane.....	239	14	1 1/2	16		890	490	730	1620		1620	
Maple Grove Violet.....	214	14	1 1/2	16	1 1/2	900	510	760	1660		1660	
Blanco.....	252	13	3 3/4	15	3 1/2	765	545	785	1550		1550	
Modestine.....	223	13	1 3/4	15	1 1/2	755	475	720	1475		1475	
Dunham's Choice Goods.....	185	13	1 3/4	15	3 1/2	670	560	780	1450		1450	
Average.....	220	13	3 1/4	15	3 1/5	818.1	489.4	726.3	1544.4		1544.4	

## Second Experiment

TABLE 3.—AVERAGE WEIGHTS, HEIGHTS, AND GAINS OF THE FILLES BY 28-DAY PERIODS

Period: 28 days	Average weight <sup>1</sup> during period		Average daily gain in weight		Average gain in height during period	
	Lot I	Lot II	Lot I	Lot II	Lot I	Lot II
	lbs.	lbs.	lbs.	lbs.	inches	inches
Dec. 12, 1916—Initial weight and height.....	811.3	818.1	.....	.....	55.53	55.28
Dec. 12, 1916—Jan. 8, 1917.....	833.4	836.6	1.92	1.58	.31	.31
Jan. 9—Feb. 5.....	885.9	882.0	1.89	1.76	.66	.75
Feb. 6—Mar. 5.....	949.4	941.4	2.01	1.98	.88	.63
Mar. 6—Apr. 2.....	1 002.4	989.8	1.89	1.72	1.09	1.00
Apr. 3—Apr. 30.....	1 058.4	1 045.3	2.03	2.12	.47	.91
May 1—May 28.....	1 108.1	1 095.4	2.23	1.87	.84	.56
May 29—June 25.....	1 182.6	1 160.4	2.25	2.32	.03	.37
June 26—July 23.....	1 220.8	1 196.9	.29	.27	.41	.19
July 24—Aug. 20.....	1 222.9	1 196.8	1.05	.60	.37	.72
Aug. 21—Sept. 17.....	1 230.0	1 211.0	-.089	.20	.10	-.06
Sept. 18—Oct. 15.....	1 250.5	1 241.1	1.12	1.72	.03	.43
Oct. 16—Nov. 12.....	1 290.4	1 276.8	1.38	1.05	.78	.57
Nov. 13—Dec. 10.....	1 314.0	1 305.5	1.33	.27	.22	.18
Dec. 11, 1917—Jan. 7, 1918.....	1 349.8	1 343.8	1.87	2.28	.91	.55
Jan. 8—Feb. 4.....	1 374.0	1 380.9	.58	1.03	.31	.20
Feb. 5—Mar. 4.....	1 415.3	1 421.8	2.12	1.92	-.35	-.12
Mar. 5—Apr. 1.....	1 453.6	1 465.3	.44	.25	.47	.53
Apr. 2—Apr. 29.....	1 487.3	1 484.8	2.05	1.78	.38	-.25
Apr. 30—May 13 (14 days).....	1 529.4	1 528.9	1.92	2.41	-.23	.44
May 13, 1918—Final weight and height.....	1 543.8	1 544.4	.....	.....	63.21	63.19
Total time: Dec. 12, 1916—May 13, 1918, 518 days	.....	.....	1.41	1.40	7.68	7.91

<sup>1</sup>Calculated from weekly weights.

## Second Experiment

TABLE 4.—WEIGHTS AND HEIGHTS OF THE FILLIES AT ONE AND TWO YEARS OF AGE

Name	Weight at		1 year's gain		Height at		Height at		1 year's gain in height inches
	1 year lbs.	2 years lbs.	in weight lbs.		1 year hands	inches	2 years hands	inches	
Lot I:									
1 Carbie.....	1020	1485	465		14	2½	15	3½	5
2 Irene.....	1110	1500	390		15	½	16	2	5½
3 Norma.....	1010	1385	375		14	1½	15	½	3½
4 Hodgson's Choice.....	1200	1635	435		14	¾	15	¾	4¼
5 Hodgson's Belle.....	1155	1635	480		15		15	3	3
6 Carins.....	1030	1500	470		14	2¾	15	¾	4¾
7 Sylvera.....	1110	1585	475		14	¾	16	½	5
8 Carnona III.....	1000	1400	400		14	2	15	3	5
Average for 8 head.....	1079.38	1515.63	436.25		14	3.0	15	3½	4½
Lot II:									
9 Keota Daisy.....	1110	1580	470		14	½	15	1	4½
10 Oaklawn's Selection.....	1020	1400	380		14	¾	15	¾	4¼
11 Black Belle.....	1165	1600	435		15	½	15	¾	2¾
12 Jane.....	1090	1575	485		15	1	15	¾	2½
13 Maple Grove Violet.....	1160	1660	500		15	¾	16	½	3¾
14 Blanlo.....	1015	1500	485		14	2¾	15	¾	4¾
15 Modestine.....	1015	1450	435		14	¾	15	1½	3¾
Dunham's Choice Goods.....	1015	(1)			14	2½	(1)		
Average for 7 head.....	1082.14	1537.86	455.71		14	3¼	15	3	3¾

<sup>1</sup>Sold before two years old.

## Second Experiment

TABLE 5.—FEED CONSUMED AND GAINS BY SEASONS

	Feed consumed						Gains	
	Grain		Alfalfa Hay		Oat straw			
	Lot I Corn 40% Oats 40% Bran 20%	Lot II Corn 50% Oats 50%	Lot I	Lot II	Lot I	Lot II	Lot I	Lot II
First Winter: December 12, 1916–May 15, 1917–155 days								
Feed per horse.....	lbs. 1321.28	1304.22	lbs. 1681.38	1452.25	lbs. 280	278	Aver. gain in weight (lbs.)....	288.1
Aver. daily ration.....	8.56	8.41	10.85	9.37	1.81	1.79	Aver. daily gain in weight (lbs.)	1.86
Aver. daily ration per cwt...	.893	.884	1.13	.985	.188	.19	Aver. gain in height (inches)...	3.41
Aver. feed per pound gain...	4.60	4.80	5.84	5.34	.97	1.02		3.60
Summer: May 16, 1917–October 22, 1917–160 days								
Feed per horse.....	955.63	944.38	555.5	555.5	.....	.....	Aver. gain in weight (lbs.)....	175.6
Aver. daily ration.....	5.97	5.90	3.47	3.47	.....	.....	Aver. daily gain in weight (lbs.)	1.11
Aver. daily ration per cwt...	.492	.494	.286	.291	.....	.....	Aver. gain in height (inches) ..	1.78
Aver. feed per pound gain...	5.44	5.34	3.16	3.14	.....	.....		2.21
Second Winter: October 23, 1917–May 13, 1918–203 days								
Feed per horse.....	2121.81	2074.31	3525.38	3349.50	182	182	Aver. gain in weight (lbs.)....	268.8
Aver. daily ration.....	10.45	10.22	17.37	16.50	.90	.90	Aver. daily gain in weight (lbs.)	1.32
Aver. daily ration per cwt...	.748	.732	1.243	1.181	.064	.064	Aver. gain in height (inches)...	2.49
Aver. feed per pound gain...	7.89	7.47	13.12	12.07	.68	.66		2.10
1 Year 5 Months: December 12, 1916–May 13, 1918–518 days								
Feed per horse.....	4403.72	4322.91	5762.25	5357.25	462	460	Aver. gain in weight (lbs.)....	732.5
Aver. daily ration.....	8.50	8.35	11.12	10.34	.89	.89	Aver. daily gain in weight (lbs.)	1.41
Aver. daily ration per cwt...	.703	.695	.919	.861	.074	.074	Aver. gain in height (inches) ..	7.68
Aver. feed per pound gain...	6.01	5.95	7.87	7.38	.63	.63		7.91

*Second Experiment*TABLE 6.—COST OF FEEDS  
(For feed prices, see bottom of page)

Lot.....	I	II	I	II	I	II
Feed cost.....	A	A	B	B	C	C
First Winter: Dec. 12, 1916—May 15, 1917—155 days						
Grain.....	\$15.38	\$14.67	\$16.24	\$15.72	\$13.99	\$12.95
Hay.....	13.45	11.62	11.77	10.17	9.25	7.99
Straw.....	.56	.56	.56	.56	.56	.56
Total.....	\$29.39	\$26.84	\$28.57	\$26.44	\$23.79	\$21.50
Per day.....	.19	.173	.184	.171	.154	.139
Per pound gain..	.102	.099	.099	.097	.083	.079
Summer: May 16, 1917—Oct. 22, 1917—160 days						
Grain.....	\$11.08	\$10.62	\$11.70	\$11.38	\$10.08	\$9.38
Hay.....	4.44	4.44	3.89	3.89	3.06	3.06
Pasture.....	10.00	10.00	10.00	10.00	10.00	10.00
Total.....	\$25.53	\$25.07	\$25.59	\$25.27	\$23.13	\$22.43
Per day.....	.16	.157	.16	.158	.145	.14
Per pound gain..	.145	.142	.146	.143	.132	.127
Second Winter: Oct. 23, 1917—May 13, 1918—203 days						
Grain.....	\$25.55	\$24.51	\$26.48	\$25.64	\$24.02	\$22.66
Hay.....	28.20	26.80	24.68	23.45	19.39	18.42
Straw.....	.36	.36	.36	.36	.36	.36
Total.....	\$54.12	\$51.67	\$51.52	\$49.45	\$43.78	\$41.45
Per day.....	.267	.255	.254	.244	.216	.204
Per pound gain..	.201	.186	.192	.178	.163	.149
One Year, 5 Months: Dec. 12, 1916—May 13, 1918—518 days						
	A	A	B	B	C	C
Grain.....	\$52.02	\$49.81	\$54.42	\$52.74	\$48.09	\$45.00
Hay.....	46.10	42.86	40.34	37.50	31.69	29.46
Straw.....	.92	.92	.92	.92	.92	.92
Pasture.....	10.00	10.00	10.00	10.00	10.00	10.00
Total..	\$109.04	\$103.59	\$105.68	\$101.16	\$90.71	\$85.38
Per day.....	.211	.20	.204	.195	.175	.165
Per pound gain..	.149	.143	.144	.139	.124	.118
Additional Cost Figures						
Lot.....	I	II	I	II	I	II
	D	D	E	E	F	F
Total: (518 days) ..	\$173.91	\$167.29	\$250.65	\$241.23	\$168.83	\$161.09
Aver. cost per day..	.34	.32	.48	.47	.33	.31
Cost of feed per pound gain....	.24	.23	.34	.33	.23	.22
Feed Prices						
	A	B	C	D	E	F
Corn per bu.....	\$ .56	\$ .65	\$ .50	\$ 1.12	\$ 1.68	\$ 1.00
Oats per bu.....	.40	.40	.35	.64	.96	.60
Bran per ton.....	26.00	26.00	26.00	40.00	60.00	40.00
Alfalfa per ton.....	16.00	14.00	11.00	25.00	35.00	25.00
Straw per ton.....	4.00	4.00	4.00	8.00	12.00	8.00
Pasture per acre.....	10.00	10.00	10.00	12.00	15.00	12.00

## Third Experiment

TABLE 1.—FEED CONSUMED

Lot I—Grain: Crushed Oats, 75 percent; Bran, 25 percent } Alfalfa Hay, Oat Hay, and Pasture  
 Lot II—Grain: Ground Corn, 75 percent; Bran, 25 percent }

Period: 28 days	Average daily ration per head						Average daily feed per cwt. of animal					
	Grain			Alfalfa			Grain			Alfalfa		
	Lot I	Lot II	lbs.	Lot I	Lot II	lbs.	Lot I	Lot II	lbs.	Lot I	Lot II	lbs.
Dec. 31, 1918—Jan. 27, 1919. ....	4.28	4.29	12.09	12.38	12.09	12.38	4.89	4.86	1.381	1.400	1.381	1.400
Jan. 28—Feb. 24. ....	4.62	4.69	13.00	13.50	13.00	13.50	5.02	5.07	1.413	1.461	1.413	1.461
Feb. 25—Mar. 24. ....	5.73	5.49	13.00	13.50	13.00	13.50	5.94	5.65	1.348	1.389	1.348	1.389
Mar. 25—Apr. 21. ....	5.68	5.21	(10.97) <sup>1</sup>	(11.13) <sup>1</sup>	(10.97) <sup>1</sup>	(11.13) <sup>1</sup>	5.68	5.14	1.097	1.099	1.097	1.099
Apr. 21—May 19. ....	6.00	5.50	.....	.....	.....	.....	5.78	5.23	.....	.....	.....	.....
May 20—June 16. ....	6.00	5.50	.....	.....	.....	.....	5.46	4.91	.....	.....	.....	.....
June 17—July 14. ....	6.00	5.50	5.00	5.00	5.00	5.00	5.36	4.80	4.46	4.37	4.46	4.37
July 15—Aug. 11. ....	5.89	5.40	3.26	3.26	3.26	3.26	5.10	4.58	2.82	2.76	2.82	2.76
Aug. 12—Sept. 8. ....	6.00	5.50	.....	.....	.....	.....	4.96	4.43	.....	.....	.....	.....
Sept. 9—Oct. 6. ....	6.00	5.50	.....	.....	.....	.....	4.68	4.20	.....	.....	.....	.....
Oct. 7—Nov. 3. ....	3.49	3.03	5.20	5.20	5.20	5.20	2.70	2.28	4.02	3.93	4.02	3.93
Nov. 4—Dec. 1. ....	3.13	2.50	6.36	6.36	6.36	6.36	2.36	1.84	4.81	4.69	4.81	4.69
Dec. 2—Dec. 29. ....	3.13	2.50	7.23	7.23	7.23	7.23	2.32	1.82	5.37	5.23	5.37	5.23
Dec. 30, 1919—Jan. 26, 1920. ....	4.40	3.33	7.50	7.50	7.50	7.50	3.25	2.42	5.55	5.44	5.55	5.44
Jan. 27—Feb. 23. ....	8.35	6.70	7.50	7.50	7.50	7.50	6.14	4.84	5.52	5.42	5.52	5.42
Feb. 24—Mar. 22. ....	11.94	8.91	7.50	7.50	7.50	7.50	8.60	6.32	5.40	5.33	5.40	5.33
Mar. 23—Apr. 19. ....	13.75	10.00	9.15	9.15	9.15	9.15	9.68	6.98	6.44	6.39	6.44	6.39
Apr. 20—May 3—(14 days).....	13.75	10.00	11.25	11.25	11.25	11.25	9.36	6.77	7.66	7.61	7.66	7.61
Total time: Dec. 31, 1918—May 3, 1920; (490 days).....	6.36	5.40	6.50	6.58	6.50	6.58	5.33	4.45	5.45	5.43	5.45	5.43
			5.08	5.08	5.08	5.08						
			10.47 <sup>2</sup>	10.46 <sup>2</sup>	10.47 <sup>2</sup>	10.46 <sup>2</sup>						

<sup>1</sup> Alfalfa hay was fed for one day during this period.<sup>2</sup> Oat hay was fed for 238 days; these figures represent the average for the period during which the oat hay was fed.

## Third Experiment

TABLE 2.—AGE, HEIGHT, AND WEIGHT OF FILLIES

Name	Age:	Height:		Height:	Weight:		Gain:	Gain:	Final weight
	Dec. 31, 1918	Dec. 31, 1918	May 3, 1920	Dec. 31, 1918	Dec. 29, 1919	May 3, 1920			
	days	hands inches	hands inches	hands inches	lbs.	lbs.	lbs.	lbs.	lbs.
LOT I:									
Hodgson's Quality.....	247	14	1½	15	3	850	550	710	1560
Mafalda.....	258	14		15	3¾	820	580	700	1520
Ionita.....	248	14	1½	15	2¼	890	440	535	1425
Avelita.....	261	13	2½	15	1½	820	430	540	1360
Louise.....	221	14		15	1¾	990	340	470	1460
Blossom.....	230	13	3¾	15	3¼	680	760	890	1570
Columbia.....	259	14	2	16	1¼	860	485	660	1520
Amy.....	284	14	2	16	1¼	860	460	580	1440
Average.....	251	14	1½	15	2¾	846.3	505.63	635.63	1481.9
LOT II:									
Hodgson's Gold Medal.....	261	14	1	15	2¾	865	425	520	1385
May Flower.....	233	13	1¾	15	1¾	730	495	625	1355
Jewel.....	303	14	1½	15	3½	920	495	600	1520
Alene C.....	266	14	1¼	16		875	485	670	1545
Janet.....	268	14	2½	16	1¼	950	515	650	1600
Izoi.....	204	14		16					
<sup>1</sup> Clarissa.....	(301)	(14	1)	15	3¾	775	625	725	1500
Cavill.....	242	14		15	2½	860	555	620	1480
Ellen C.....	301	14	1¼	15	3½	850	570	685	1535
Average.....	260	14	1½	15	3½	853.1	520.63	636.88	1490.0

<sup>1</sup>Clarissa substituted for Izoi on April 22, 1919.

*Third Experiment*

TABLE 3.—AVERAGE WEIGHTS, HEIGHTS, AND GAINS OF THE FILLES BY 28-DAY PERIODS

Period: 28 days	Average weight during period <sup>1</sup>		Average daily gain in weight		Average gain in height during period	
	Lot I <i>lbs.</i>	Lot II <i>lbs.</i>	Lot I <i>lbs.</i>	Lot II <i>lbs.</i>	Lot I <i>inches</i>	Lot II <i>inches</i>
Dec. 31, 1918—Initial weight and height.....						
Dec. 31, 1918—Jan. 27, 1919.....	874.9	883.4	1.90	1.94	.72	.72
Jan. 28—Feb. 24.....	920.0	923.5	1.27	1.09	.53	.78
Feb. 25—Mar. 24.....	964.4	971.4	1.94	2.25	1.28	.60
Mar. 25—Apr. 21.....	1000.4	1012.9	.89	.87	.16	.34
Apr. 22—May 19.....	1037.5	1051.1	2.25	1.99	.84	.75
May 20—June 16.....	1099.8	1119.9	1.27	1.76	.06	.37
June 17—July 14.....	1119.9	1145.0	1.14	.98	.69	.60
July 15—Aug. 11.....	1155.0	1180.1	.58	1.63	.09	.46
Aug. 12—Sept. 8.....	1208.8	1240.9	3.15	2.70	.66	.66
Sept. 9—Oct. 6.....	1281.3	1311.3	2.05	2.10	.16	.22
Oct. 7—Nov. 3.....	1292.6	1324.6	Loss	Loss	.43	.44
Nov. 4—Dec. 1.....	1322.1	1356.1	1.45	1.18	.41	.62
Dec. 2—Dec. 29.....	1347.0	1369.9	.69	.45	.03	.06
Dec. 30, 1919—Jan. 26, 1920.....	1352.4	1377.4	Loss	.40	.06	....
Jan. 27—Feb. 23.....	1359.6	1383.8	.54	Loss	....	.09
Feb. 24—Mar. 22.....	1389.1	1408.5	.98	1.00	.63	.54
Mar. 23—Apr. 19.....	1420.8	1432.1	2.21	1.83	....	....
April 20—May 3, (14 days).....	1469.4	1477.5	1.92	1.88	....	....
May 3, 1920—Final weight and height.....	1481.9	1490.0	....	....	62.88	63.38
Total time: Dec. 31, 1918—May 3, 1920, 490 days	.....	.....	1.30	1.30	6.41	6.84

<sup>1</sup>Calculated from weekly weights.



## Third Experiment

TABLE 4.—WEIGHTS AND HEIGHTS OF THE FILLIES AT ONE AND TWO YEARS OF AGE

Name	Weight at 1 year	Weight at 2 years	1 year's gain in weight	Height at 1 year	Height at 2 years	1 year's gain in height
	lbs.	lbs.	lbs.	hands inches	hands inches	inches
Lot I:						
1 Hodgson's Quality.....	1075	1530	455	14 3	15 2 $\frac{3}{4}$	3 $\frac{3}{4}$
2 Mafalda.....	1035	1495	460	14 3 $\frac{1}{2}$	15 3 $\frac{1}{4}$	3 $\frac{3}{4}$
3 Ionita.....	1015	1425	410	14 3 $\frac{1}{4}$	15 2	2 $\frac{3}{4}$
4 Avelita.....	965	1315	350	14 1 $\frac{1}{2}$	15 1 $\frac{1}{2}$	3
5 Louise.....	1125	1475	350	15	15 3 $\frac{1}{4}$	3 $\frac{1}{4}$
6 Blossom.....	1005	1600	595	14 3 $\frac{1}{4}$	15 3 $\frac{3}{4}$	4 $\frac{1}{2}$
7 Columbia.....	1020	1490	470	15 1 $\frac{1}{2}$	16	3 $\frac{1}{2}$
8 Amy.....	1015	1350	335	15 2	16 2	2
Average for 8 head.....	1031.88	1460.00	428.13	14 3 $\frac{3}{4}$	15 2	3 $\frac{1}{4}$
Lot II:						
9 Hodgson's Gold Medal.....	995	1325	330	14 3 $\frac{1}{4}$	15 2 $\frac{1}{2}$	3 $\frac{1}{4}$
10 Mayflower.....	950	1360	410	14 1 $\frac{1}{2}$	15 3	5 $\frac{1}{2}$
11 Jewel.....	1025	1430	405	14 3 $\frac{1}{2}$	16 3 $\frac{1}{4}$	5 $\frac{1}{4}$
12 Alene C.....	1060	1485	425	14 3 $\frac{1}{2}$	15 1 $\frac{1}{4}$	1 $\frac{3}{4}$
13 Janet.....	1055	1540	485	14 3 $\frac{3}{4}$	16 1	5 $\frac{1}{4}$
14 Clarissa.....	1085	1580	495	14 2 $\frac{1}{2}$	16 2	7 $\frac{1}{2}$
15 Cavill.....	1060	1480	420	14 2	15 2 $\frac{1}{2}$	4 $\frac{1}{2}$
16 Ellen C.....	1010	1475	465	14 2 $\frac{1}{2}$	16 1	6 $\frac{1}{2}$
Average for 8 head.....	1030	1459.38	429.38	14 2 $\frac{3}{4}$	15 3 $\frac{3}{4}$	5

## Third Experiment

TABLE 5.—FEED CONSUMED AND GAINS BY SEASONS

	Feed consumed				Gains	
	Grain		Alfalfa hay		Oat hay	
	Lot I Gr. oats 75% Brn... 25%	Lot II Gr. corn 75% Brn... 25%	Lot I	Lot II	Lot I	Lot II
First Winter: December 31, 1918—April 21, 1919—112 days						
Feed per horse.....	lbs. 568.56	lbs. 550.81	lbs. 1373.75	lbs. 1414.25	lbs. .....	Aver. gain in weight (lbs.)....
Aver. daily ration.....	5.08	4.92	12.27	12.63	.....	Aver. daily gain in weight (lbs.)..
Aver. daily ration per cwt. . .	.54	.519	1.305	1.332	.....	Aver. gain in height (inches)...
Aver. feed per pound gain....	3.38	3.19	8.17	8.20	.....	.....
Summer: April 22 – October 13—175 days						
Feed per horse.....	1038.00	951.50	256.25 <sup>1</sup>	256.25 <sup>1</sup>	76.25 <sup>2</sup>	75.00 <sup>2</sup>
Aver. daily ration.....	5.93	5.44	1.46	1.46	.....	.....
Aver. daily ration per cwt. . .	.513	.46	.127	.124	.....	.....
Aver. feed per pound gain....	3.93	3.26	.97	.88	.03	.03
Second Winter: October 14, 1919—May 3, 1920—203 days						
Feed per horse.....	1508.38	1144.63	1555.00	1555.00	2415.00	2415.00
Aver. daily ration.....	7.43	5.64	7.66	7.66	11.90	11.90
Aver. daily ration per cwt. . .	.544	.406	.561	.552	.871	.857
Aver. feed per pound gain....	7.43	6.64	7.66	9.01	11.88	14.00
1 Year 4½ Months: December 31, 1918—May 3, 1920—490 days						
Feed per horse.....	3114.94	2646.94	3185.00	3225.50	2491.25	2490.00
Aver. daily ration.....	6.36	5.40	6.50	6.58	5.08	5.08
Aver. daily ration per cwt. . .	.533	.445	.545	.543	.426	.419
Aver. feed per pound gain....	4.90	4.16	5.01	5.06	3.92	3.91
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<sup>1</sup> Alfalfa was fed as pasture supplement for 48 days during the summer<sup>2</sup> Oat hay was fed as pasture supplement at the rate of 2 pounds per head per day during last 5 weeks of pasture season.

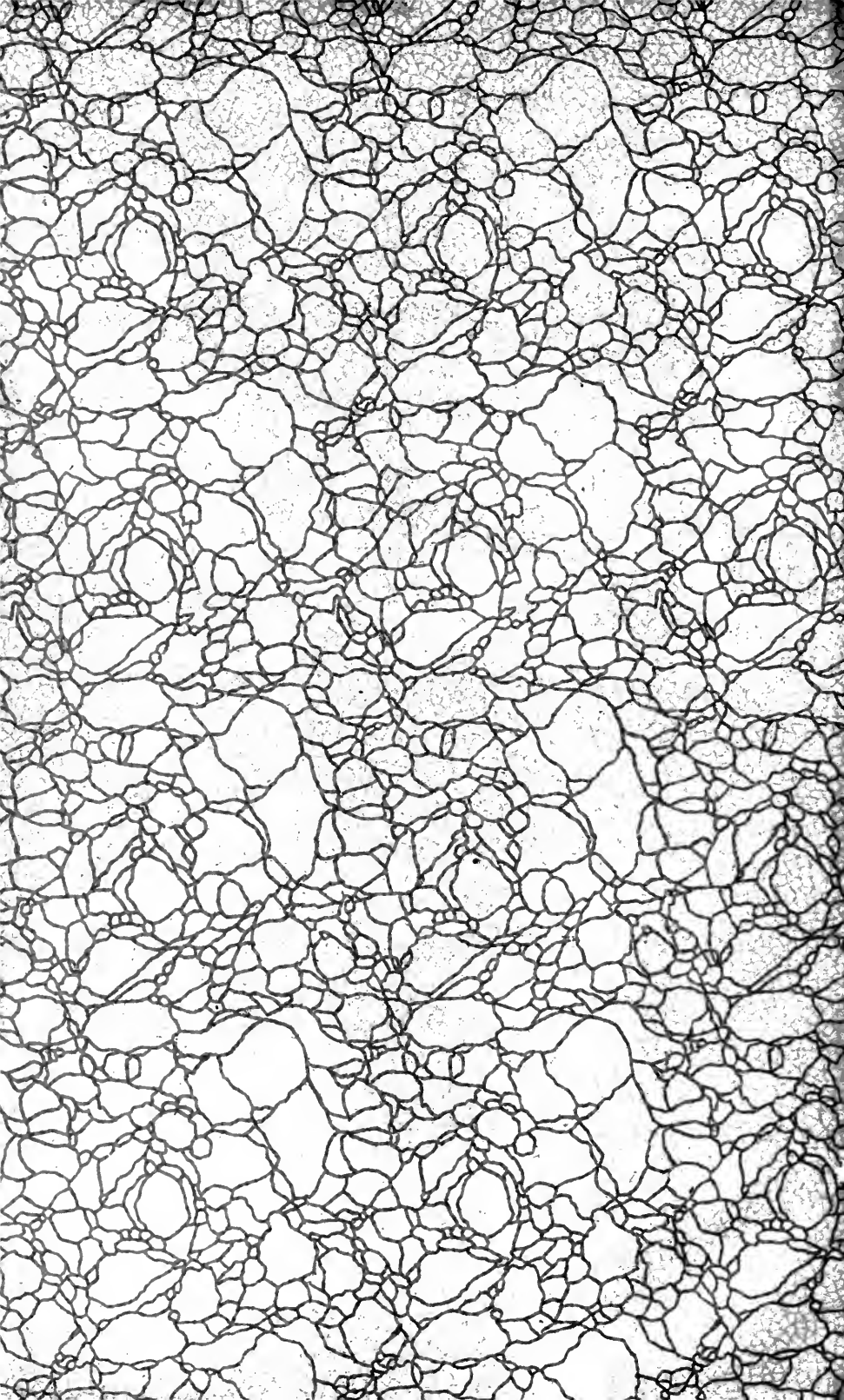
*Third Experiment*TABLE 6.—COST OF FEEDS  
(For feed prices, see bottom of page)

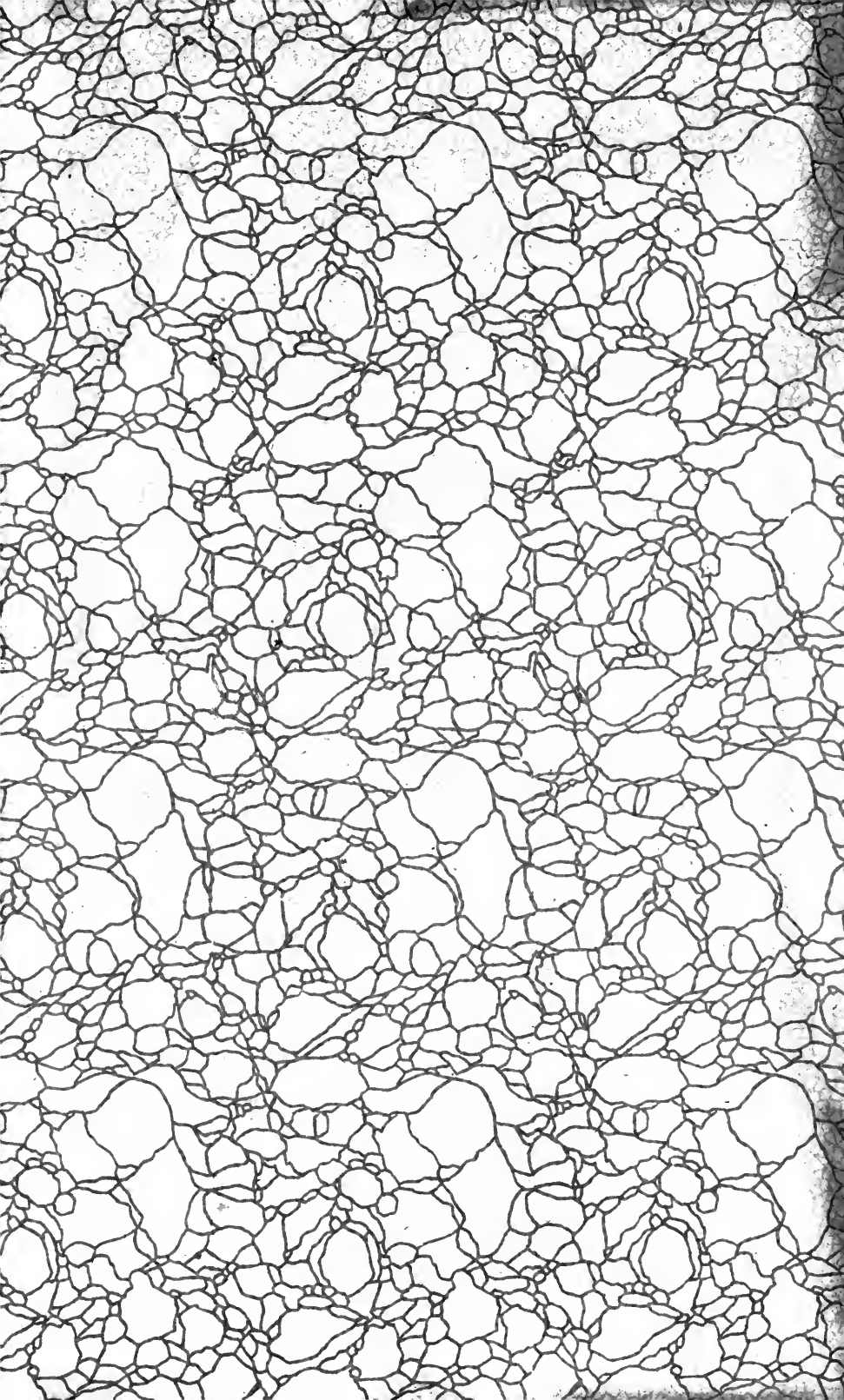
Lot.....	I	II	I	II	I	II
Feed cost.....	A	A	B	B	C	C
First Winter: Dec. 31, 1918—Apr. 21, 1919—112 days						
Grain.....	\$ 7.18	\$ 5.92	\$ 7.18	\$ 6.59	\$ 6.51	\$ 5.48
Alfalfa.....	10.88	11.36	9.52	9.94	7.48	7.81
Total.....	\$18.06	\$17.28	\$16.70	\$16.53	\$13.99	\$13.29
Per day.....	.161	.154	.149	.148	.125	.119
Per pound gain...	.107	.100	.099	.096	.083	.077
Summer: Apr. 22—Oct. 13—175 days						
Grain.....	\$13.11	\$10.23	\$13.11	\$11.38	\$11.89	\$ 9.47
Alfalfa.....	2.08	2.08	1.82	1.82	1.43	1.43
Oat Hay.....	.32	.32	.28	.28	.24	.24
Pasture.....	10.00	10.00	10.00	10.00	10.00	10.00
Total.....	\$25.51	\$22.63	\$25.21	\$23.48	\$23.56	\$21.14
Per day.....	.146	.129	.144	.134	.135	.121
Per pound gain ..	.096	.078	.095	.08	.089	.072
Second Winter: Oct. 14, 1919—May 3, 1920—203 days						
Grain.....	\$19.04	\$12.30	\$19.04	\$13.68	\$17.27	\$11.39
Alfalfa.....	12.48	12.48	10.92	10.92	8.58	8.58
Oat Hay.....	9.68	9.68	8.47	8.47	7.26	7.26
Total.....	\$41.20	\$34.46	\$38.43	\$33.07	\$33.11	\$27.23
Per day.....	.203	.17	.189	.163	.163	.134
Per pound gain ..	.203	.20	.189	.192	.163	.158
1 Year 4½ Months: Dec. 31, 1918—May 3, 1920—490 days						
	A	A	B	B	C	C
Grain.....	\$39.33	\$28.45	\$39.33	\$31.64	\$35.68	\$26.33
Alfalfa.....	25.44	25.76	22.26	22.54	17.49	17.71
Oat Hay.....	10.00	10.00	8.75	8.75	7.50	7.50
Pasture.....	10.00	10.00	10.00	10.00	10.00	10.00
Total.....	\$84.77	\$74.21	\$80.34	\$72.93	\$70.67	\$61.54
Per day.....	.173	.151	.164	.149	.144	.126
Per pound gain ..	.133	.117	.126	.115	.111	.097
Additional Cost Figures						
Lot.....	I	II	I	II	I	II
	D	D	E	E	F	F
Total: (490 days) ..	\$129.05	\$120.18	\$186.60	\$173.26	\$128.62	\$118.43
Aver. cost per day ..	.26	.25	.38	.35	.26	.24
Cost of feed per pound gain ....	.20	.19	.29	.27	.20	.19
Feed Prices						
	A	B	C	D	E	F
Corn per bu.....	\$ .56	\$ .65	\$ .50	\$ 1.12	\$ 1.68	\$ 1.00
Oats per bu.....	.40	.40	.35	.64	.96	.60
Brn per ton.....	26.00	26.00	26.00	40.00	60.00	40.00
Alfalfa per ton.....	16.00	14.00	11.00	25.00	35.00	25.00
Oat hay.....	8.00	7.00	6.00	12.00	18.00	14.00
Pasture per acre.....	10.00	10.00	10.00	12.00	15.00	12.00

## SUMMARY OF THREE TRIALS

	First Trial		Second Trial		Third Trial	
	Ear corn ½ Oats ½ Alfalfa hay Pasture (Reported in Bul. 192)	Lot I Corn 40% Oats 40% Bran 20% Alfalfa Oat straw Pasture	Lot II Corn 50% Oats 50% Alfalfa Oat straw Pasture	Lot I Cr. oats 75% Bran 25% Alfalfa Oat hay Pasture	Lot II Gr. corn 75% Bran 25% Alfalfa Oat hay Pasture	
Length of trial, <i>days</i> .....	518	518	518	490	490	
Number of animals .....	10	8	8	8	8	
Aver. age at beginning, <i>days</i> .....	214	230	220	251	260	
<i>Height:</i>						
Aver. height at beginning .....	13 - 2.3"	13 - 3.5"	13 - 3.25"	14 - .53"	14 - .53"	
Aver. height at close .....	15 - 2.3"	15 - 3.21"	15 - 3.19"	15 - 2.88"	15 - 3.38"	
Aver. gain in height, <i>inches</i> .....	7.96	7.68	7.91	6.41	6.84	
<i>Weight:</i>						
Aver. weight at beginning, <i>pounds</i> .....	823.00	811.25	818.13	846.25	853.13	
Aver. weight at close .....	1513.50	1543.80	1544.40	1481.90	1490.00	
Aver. gain in weight .....	690.50	732.50	726.30	635.63	636.88	
Aver. daily gain in weight .....	1.33	1.41	1.40	1.30	1.30	
<i>Grain:</i>						
Total amount of grain eaten, <i>pounds</i> .....	5079.00	4403.72	4322.91	3114.94	2646.94	
Aver. amount of grain eaten per day .....	9.81	8.50	8.35	6.36	5.40	
Aver. amount of grain eaten per day per cwt .....	.811	.703	.695	.533	.445	
<i>Hay:</i>						
Total amount of hay eaten, <i>pounds</i> .....	5168.60	5702.25	5357.25	3185.00	3225.50	
Aver. amount of hay per day .....	9.98	11.12	10.34	6.50	6.58	
Aver. amount of hay per day per cwt .....	.825	.919	.861	.545	.543	
<i>Other roughage:</i>						
Total amount of other roughage eaten, <i>pounds</i> .....	.....	462.00	460.00	2491.25	2490.00	
Aver. amount of other roughage per day .....	.....	.89	.89	5.08	5.08	
Aver. amount of other roughage per day per cwt .....	.....	.074	.074	4.26	4.19	
<i>Aver. amount of feed per pound gain:</i>						
Grain .....	7.36	6.01	5.95	4.90	4.16	
Alfalfa .....	7.49	7.87	7.38	5.01	5.06	
Other roughage .....	.....	.631	.633	3.92	3.91	







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